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**BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Application Number: 10/678,799
Filing Date: October 03, 2003
Appellant(s): GERLACH, TOBIAS



James N. Kallis
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 23 March 2005.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct in that claims 1-3, 6-7, 9-13, and 16-19 are pending. Appellant does indicate that claims 4, 8, 14-15, and 20 have been cancelled while in fact claims 4, 5, 8, 14-15, and 20 have been cancelled.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct. The After Final Amendment mailed November 08, 2004, has been entered.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

The following is a listing of the evidence (e.g., patents, publications, Official Notice, and admitted prior art) relied upon in the rejection of claims under appeal.

U.S. Patent No. 5,977,732 to Matsumoto

U.S. Patent No. 3,935,512 to Falk et al.

U.S. Patent No. 6,038,532 to Kane et al.

U.S. Patent No. 4,952,854 to Periou et al.

Appellant's Admission in the specification, page 1, lines 14-15.

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-3, 6, 11-13, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,977,732 to Matsumoto in view of U.S. Patent No. 3,935,512 to Falk et al. and further in view of U.S. Patent No. 6,038,532 to Kane et al.

Matsumoto discloses a method for determining the frequency of current ripples contained in an analog armature current signal of a commutated direct current motor (column 6, lines 31-32 and 60) comprising determining an armature current signal (column 6, lines 34-37 and column 7, lines 20-21), determining a result of the current ripples contained in the armature current signal based on the armature current signal and determining a current ripple frequency from the current ripples contained in the armature current signal, without filtering (column 7, lines 18-21), during a start-up phase of the motor (column 6, lines 37-50 and column 11, lines 11-17).

Matsumoto discloses determining the rotational speed of a drive shaft of the motor based on the current ripple frequency (column 7, lines 25-28).

Matsumoto discloses monitoring the current ripple frequency for changes during the operation of the motor (column 12, lines 13-27 and 52-60) by counting the current ripples contained in the armature current signal and modifying the number of counted ripples as a function of a changes in the current ripple frequency (column 7, lines 33-38).

As noted above, the invention of Matsumoto teaches many of the features of the claimed invention and while the invention of Matsumoto determines current ripples in an armature current signal, Matsumoto does not include means for removing interference from the armature current signal using a voltage signal that contains the interference.

Falk teaches a circuit for the compensation of current interference signals including means for determining a useful part of a current signal (column 3, lines 58-

66) by sensing a current signal containing a useful part and interference (column 3, lines 1-9), obtaining a voltage signal that contains the interference (column 3, lines 14-21) and subtracting the voltage signal from the current signal to result in the current signal void of interference (column 3, lines 30-34).

It would have been obvious to one having ordinary skill in the art to modify the invention of Matsumoto to include means for removing interference from the armature current signal using a voltage signal that contains the interference, as taught by Falk, because it is considered to be well known in the art, as well as admitted by Applicant (specification, page 1, lines 14-15), that an armature current signal, such as that of Matsumoto, contains interference and, as suggested by Falk, the combination would have provided means for removing the interference to improve the detection of the ripple component by distinguishing the part of the signal that is representative of the device operation from disturbances caused by a source (column 1, lines 61-66).

As noted above, the invention of Matsumoto and Falk teaches many of the features of the claimed invention including subtracting a noise component represented by a voltage signal from an armature current signal to determine the resulting current ripple, but does not teach performing the subtraction digitally using a Fourier transform.

Kane teaches a signal processing device for canceling noise in a signal including means for sensing an analog signal containing both a useful signal component and a noise component (column 2, lines 38-41), digitizing the analog signal (column 2,

lines 42-44) and determining a frequency spectral result of the digitized signal using a fast Fourier transform (column 2, lines 45-48) and canceling the noise component of the signal by subtracting a noise prediction signal (column 3, lines 26-32).

It would have been obvious to one having ordinary skill in the art to modify the invention of Matsumoto and Falk to include performing the subtraction digitally using a Fourier transform, as taught by Kane, because Kane suggests a method for frequency analysis that is well-known in the art to provide the user with easier mathematical analysis and more accurate analysis due to the signals being better defined in classical mathematical signal processing terms and, as suggested by Kane, provided better interference elimination by completely eliminating the noise through clearly defined spectral frequencies (column 3, lines 28-43).

Claims 7, 9, 10, 17, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto in view of Falk et al. and Kane et al. and further in view of U.S. Patent No. 4,952,854 to Periou et al.

As noted above, Matsumoto in combination with Falk and Kane teaches many of the features of the current invention including determining a rotational speed of a drive shaft of the motor based upon a the current ripple frequency but does not specify determining the position based upon the rotational speed.

Periou teaches a control device for a DC motor intended for driving opening elements on an automobile, such as a window (column 1, lines 23-25), including

means for determining the rotational speed of the motor and from this speed determining the angular position of the motor shaft (column 2, lines 44-50).

It would have been obvious to one having ordinary skill in the art to modify the invention of Matsumoto, Falk and Kane to include determining the position based upon the rotational speed, as taught by Periou, because Periou suggests a method for controlling the operation of a window motor in a vehicle to stop upon detection of an object, similar to that of Matsumoto, Falk, and Kane, that would have improved operation by actively determining position as compared to a set value as well as avoiding unnecessary stoppages by taking into account parameters of the circuit (column 2, line 45 to column 3, line 3).

**(10) Response to Argument**

Appellant first argues:

"The claimed invention generally differs from any combination of Matsumoto, Falk, and Kane in that in the claimed invention a frequency spectral result of the current ripples contained in an armature current signal is determined from differences between (i) a frequency spectral result of the armature current signal of the motor in which the armature current signal contains current ripples and interference and (ii) a frequency spectral result of a voltage signal of the motor in which the motor voltage signal contains the interference such that the determined frequency spectral result of the current ripples contained in the armature current signal is void of frequency components which are superimposed on the armature current signal as the interference."

Appellant then describes the differences stating,

"The claimed invention differs from Falk in that in the claimed invention characteristics of two signals (e.g., the armature current signal and a motor voltage signal) based on two different things (e.g., the armature current and a motor voltage) are compared to one another whereas in Falk characteristics of two signals (e.g., the

voltage signal ($u_B$) and the derivative current signal ($u_i$) based on the same thing (e.g., the monitored current (i)) are compared to one another). As such, modifying Matsumoto to include means for removing interference from the armature current signal using a voltage signal that contains the interference as taught by Falk does not result in the claimed invention because such a modification would essentially include using a voltage signal that is based on the armature current signal. That is, the modification of Matsumoto as suggested by Falk would result in removing interference from the armature current signal using some form of the armature current signal itself (i.e., using a voltage signal which is based on the armature current signal). In contrast, the claimed invention removes interference from the armature current signal using a motor voltage signal."

The Examiner asserts that the claimed invention only requires, for example in independent claim 1, "determining a frequency spectral result of the armature current signal of the motor in which the armature current signal contains current ripples and interference" and "determining a frequency spectral result of a voltage signal of the motor in which the voltage signal contains interference". These limitations do not specify that the characteristics of the two signals be based on two different things, but only that both the armature current signal and voltage signal both be "of the motor".

Turning to Appellant's arguments, Appellant explicitly admits that "the modification of Matsumoto as suggested by Falk would result in removing interference from the armature current signal using some form of the armature current signal itself (i.e., using a voltage signal which is based on the armature current signal)." Therefore, since the armature current signal is "of the motor" (Matsumoto, column 11, lines 26-27) and Appellant is admitting that the combination would provide a voltage signal based on the armature current signal, the voltage

signal would also be "of the motor" and would therefore meet the invention as claimed.

Appellant then argues that

"what Matsumoto and Falk fail to suggest without the benefit of the Applicant's disclosure is where to find such a voltage signal that contains the interference common to the interference contained in the armature current signal and at the same time is essentially void of contributions resulting from the current ripples contained in the armature current signal. Such a voltage signal is the claimed motor voltage signal. That is, assuming that it is obvious to compare an armature current signal with a 'voltage signal' containing the same interference it is not obvious without the benefit of the Applicant's disclosure to compare the armature current signal with a 'motor voltage signal' which does indeed contain the interference. That is, the Applicant has discovered that a voltage signal of the motor is suitable for use as a voltage signal which contains the interference common to the interference contained in the armature current signal while at the same time being essentially void of contributions resulting from the current ripples contained in the armature current signal."

The Examiner asserts that, as noted above, the invention as claimed does not include any limitations requiring where to find a voltage signal that contains the interference common to the interference contained in the armature current signal and at the same time is essentially void of contributions resulting from the current ripples contained in the armature current signal, but only requires that the voltage signal be "of the motor" and "contain the interference".

The Examiner maintains that the combination of Matsumoto and Falk does meet these limitations since, as noted above, the voltage signal is "of the motor" and since Falk teaches a circuit for the compensation of current interference signals including means for determining a useful part of a current signal (column 3, lines 58-66) by sensing a current signal containing a useful part and interference (column 3, lines 1-

9), obtaining a voltage signal that contains the interference (column 3, lines 14-21) and subtracting the voltage signal from the current signal to result in the current signal void of interference (i.e. the voltage signal $u_B$ is outputted at the negative output terminal of amplifier 22 and combined with the positive current signal to perform the subtraction) (column 3, lines 30-34 and Figure 1).

Further, with respect to the limitation that the voltage signal "contains the interference", Appellant explicitly admits that Falk teaches "removing interference from the armature current signal using a voltage signal that contains the interference" (Appellant's Brief, page 11, lines 9-11).

Appellant further argues the rejection of claims 7, 9-10, and 17-19 because "they depend from one of independent claims 1 and 11 and include the limitations of their respective base claim."

The Examiner maintains, however, that the limitations of claims 1 and 11 are taught by the combination of Matsumoto, Falk et al. and Kane et al. and therefore Appellant's arguments with respect to claims 7, 9-10, and 17-19 are not persuasive.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

jrw

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